

Claims

We claim:

- 1 1. A method for encoding a video, comprising:
 - 2 applying a dual-tree discrete wavelet transform to the video to
 - 3 generate a plurality of sequences of wavelet coefficients; and
 - 4 compressing the plurality of sequences to produce a compressed
 - 5 bitstream corresponding to the video.
- 1 2. The method of claim 1, in which the compressing further comprises:
 - 2 selecting iteratively the wavelet coefficients in a large to small order;
 - 3 and
 - 4 entropy encoding the selected wavelet coefficient.
- 1 3. The method of claim 2, further comprising:
 - 2 predicting a subset of the wavelet coefficients of the sequences.
- 1 4. The method of claim 1, in which there are four sequences having a spatial
 - 2 and temporal correlation.
- 1 5. The method of claim 2, in which the entropy encoding is arithmetic
 - 2 encoding.
- 1 6. The method of claim 2, in which the entropy encoding is content-adaptive
 - 2 arithmetic coding.

- 1 7. The method of claim 2, in which the selecting is a noise shaping method.
- 1 8. The method of claim 7, in which the noise shaping method modifies large
2 wavelet coefficients to compensate for a loss of small wavelet coefficients,
3 without substantially changing content of the video.
- 1 9. The method of claim 7, in which the noise shaping method further
2 comprises:
3 quantizing the wavelet coefficients to produce quantized wavelet
4 coefficients;
5 inverse transforming the quantized wavelet coefficient to a quantized
6 video;
7 determining an error signal between the video and the quantized
8 video;
9 applying the dual-tree discrete wavelet transform to the error signal;
10 adding the transformed error signal, after a delay, to the quantized
11 wavelet coefficients.
- 1 10. The method of claim 2, in which the selecting uses a matching pursuit
2 method.
- 1 11. The method of claim 10, in which the matching pursuit method
2 iteratively selects the wavelet coefficients in a large to small order.
- 1 12. The method of claim 2, in which the selecting uses a noise shaping
2 method.

1 13. The method of claim 2, in which the selecting uses a matching pursuit
2 method.

1 14. The method of claim 3, in which the predicted subset of the wavelet
2 coefficients are in low energy subbands.

1 15. The method of claim 2, in which the sequences are encoded bitplane by
2 bitplane in a most significant bit to least significant bit order.

1 16. The method of claim 1, in which the compressed bitstream is expressed
2 as multiple descriptions.

1 17. The method of claim 16, in which the plurality of sequences are coded
2 independently to produce the multiple descriptions.

1 18. The method of claim 16, in which subsets of the wavelet coefficient are
2 coded to produce the multiple descriptions.

1 19. The method of claim 16, further comprising:
2 estimating, in a receiver, lost descriptions from a subset of the
3 multiple descriptions received.